Hammerhorn Campground Restoration

And Salvage Project

Aquatics Biological Evaluation

Mendocino National Forest

Covelo Ranger District

Prepared by: Joshua Abel, District Fisheries Biologist, Oct 2021

Summary of Determinations

Species/Habitat	Status	Determination
SONCC Coho salmon ESU *Oncorhynchus kisutch*	T	No Effect
SONCC Coho salmon ESU Critical Habitat	CH	No Effect
CC Chinook salmon ESU *Oncorhynchus tshawytscha*	T	No Effect
CC Chinook salmon ESU Critical Habitat	CH	No Effect
NC Steelhead trout *Oncorhynchus mykiss*	T	MANLAA
NC Steelhead trout Critical Habitat	CH	MANLAA
Pacific Lamprey *Entosphenus tridentatus*	S	MANLAA
Western Brook Lamprey *Lampetra richardsoni*	S	MANLAA
Foothill yellow-legged frog *Rana boylii*	S	MANLAA
Western pond turtle *Actinemys marmorata*	S	MANLAA

T=Threatened, S=Sensitive, CH= Critical Habitat

Introduction

The purpose of this biological evaluation (BE) is to determine the effects of the implementation of the Hammerhorn Campground Restoration and Salvage Project on endangered, threatened, proposed, candidate species and their critical habitat, as listed by the National Marine Fisheries Service (NMFS). Forest Service Senstive and Management Indicator Species. This analysis was prepared in accordance with Forest Service Manual (FSM 2670) direction and the Endangered Species Act (as amended).

The project is located on the Covelo Ranger District within the Mendocino National Forest in Mendocino County, California. The project area is located approximately 17 miles northwest of the town of Covelo, CA, and just south of the southern boundary of the Yolla Bolly Wilderness area (figure 1). The project area lies completely within the Beaver Creek subwatershed (HUC12). Of the 11,402 acre project area 250 acres are proposed for salvage logging operations. The salvage logging units are located in the immediate surroundings of the Hammerhorn campground and the M21 forest road (figure 2). The action area for this project will be the 250 acres of salvage units and their immediate downstream habitats.

Table 1: Endangered, Threatened, Proposed, Candidate species and their designated critical habitat in the project area.

Species/Habitat	Status	Project within species distribution range (Y/N)	Habitat in or near project area (Y/N)	Species present (Y/N)	Effects	Determination
SONCC Coho salmon ESU *Oncorhynchus kisutch (Walbaum)*	T	Y	Y	N	None	No Effect
SONCC Coho salmon ESU Critical Habitat	CH	Y	Y	N	None	No Effect
CC Chinook salmon ESU *Oncorhynchus tshawytscha* (Walbaum)	T	Y	Y	N	None	No Effect
CC Chinook salmon ESU Critical Habitat	CH	Y	N	N	None	No Effect
NC Steelhead trout *Oncorhynchus mykiss* (Walbaum)	T	Y	Y	Y	Indirect	MANLAA
NC Steelhead trout Critical Habitat	CH	Y	Y	Y	Indirect	MANLAA

The project area is within the distribution range and habitat is present for the **Southern Oregon/Northern California Coasts (SONCC) Coho salmon, California Coastal (CC)**

Chinook salmon and the **Northern California (NC) Steelhead**; therefore, these species will be further discussed in this analysis, and the effects of proposed actions on these species and their critical habitat will be considered.

Critical habitat for **SONCC Coho salmon and NC Steelhead** has been identified in the project area; therefore, critical habitat for SONCC Coho salmon will be considered in this analysis (NMFS, 1999). There is no identified critical habitat for CC Chinook salmon in the project area; therefore, critical habitat for CC Chinook salmon will not be considered in this analysis (NMFS, 2000).

In addition to managing the Chinook and coho salmon listed under the Endangered Species Act (ESA), salmon are also managed by NMFS under the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-297). Under the MSFCMA, all federal agencies are required to consult with NMFS regarding any actions or proposed actions that may adversely affect Essential Fish Habitat (EFH) for commercial marine fish species (e.g. Chinook salmon).

EFH is defined as those waters and substrate necessary to fish for spawning, breeding, feeding, and growth to maturity. For Chinook salmon, EFH within the anadromous fish producing watersheds on the Mendocino National Forest includes areas already designated as critical habitat for Chinook salmon. Based upon a NMFS finding (September 21, 2000) and U.S. Forest Service concurrence (November 7, 2000), the ESA Section 7 consultation process used by the Forest Service for Federal activities can be used to satisfy EFH consultation. Thus, for this action, this biological assessment also suffices as the EFH assessment.

Consultation to Date

Joshua Abel, USFS and Tom Daugherty, NMFS, discussed the proposed project on June 10, 2021. NMFS was provided with the general project description, maps, and further project clarification.

Joshua Abel, Hilda Kwan, and Gary Urdahl, USFS further discussed project design and mitigation measure with Tom Daugherty, NMFS on July 14, 2021.

Joshua Abel, USFS and Tom Daugherty, NMFS, discussed further project details on October 5, 2021.

Table 2: USDA Forest Service, Pacific Southwest Region, Mendocino National Forest, Regional Forester's sensitive fish species.

Species	Status	Project within Distribution Range (Y/N)	Habitat in or near project area (Y/N)	Species present (Y/N)	Effects	Determination
Pacific Lamprey *Entosphenus tridentatus*	S	Y	Y	N	I	MANLAA
Western Brook Lamprey *Lampetra richardsoni*	S	Y	Y	N	I	MANLAA
Foothill yellow-legged frog *Rana boylii*	S	N	N	N	I	MANLAA
Western pond turtle *Actinemys marmorata*	S	Y	N	N	I	MANLAA

Species were not further considered for analysis in this document if:

1) The project is not within the distribution range of a species, **Clear Lake Hitch** (Moyle, 2002).

2) Habitat and/or species are not present in project area, **Hardhead** (Moyle, 2002).

Current Management Direction

Current management direction is based on the guidance documented in the Mendocino National Forest, Land and Resource Management Plan (LRMP), dated February, 1995 and the subsequent Record of Decision (ROD) dated July 1996. The Mendocino National Forest LRMP describes standard and guidelines that would be incorporated into the project design. Management requirements would also incorporate Best Management Practices (BMPs) relevant to this particular project, as described in the Water Quality Management for Forest System Lands in California – Best Management Practices (USDA, 2000).

On June 20, 1997, NMFS issued a Biological Opinion for the MNF Land and Resource Management plan (LRMP), and on April 16, 2001, NMFS sent a letter of response to re-initiate consultation on the LRMP. The Biological Opinion for the LRMP identified "Reasonable and prudent measures" on page 55, and terms and conditions on page 58 requiring the Forest to

utilize the Level 1 team consultation process and apply the NMFS Checklist and Matrix of Pathways and Indicators (NMFS, 1996) to evaluate all proposed activities that may affect listed, proposed or candidate species of Pacific salmonids. Term and condition 2b on page 59 states: "to facilitate the ESA consultation process and ensure agreement on effects determinations, utilize the Level 1 process and apply the NMFS' Checklist and Matrix of Pathways and indicators (NMFS, 1996) to determine whether proposed actions are either "May Affect, Not Likely to Adversely Affect" or "May Affect, Likely to Adversely Affect" listed, proposed, or candidate species of the Pacific salmonids. The NMFS Checklist and Matrix of Pathways and Indicators were used to evaluate the effects of the proposed actions on the anadromous habitat in or near the planning area.

Description on Proposed Action

- **Sale of merchantable timber**: This project proposes making merchantable dead or fire - damaged trees on up to 250 acres in the vicinity of the Hammerhorn Campground available for sale. Some trees and snags will be retained to serve as seed sources for natural regeneration, shade, and wildlife habitat. Trees reserved for habitat and propagation purposes will be marked for retention. Designated salvage units would be located on slopes less than 36 percent and away from inner gorges and unstable areas to minimize erosion. Harvested timber would be skidded to designated landing and access roads. Harvesting of trees within the campground and along the roads associated with the salvage units would follow the "Tree Marking Guidelines for Fire-Injured Trees," which is based on guidelines developed by this regional headquarters' Forest Health Protection unit. Trees not within the campground or a roadside hazard tree threat will not be following the guideline. The salvage of these trees will only include tree that have no live crown.

  Trees species subject to removal through the timber sale include ponderosa pine, sugar pine, white fire, incense cedar, and Douglas-fir. Broadleaf trees, such as black oak, live oak and white oak, as well as species associated with riparian areas, such as California bay laurel, bigleaf maple, willow, and white alder, would not be removed unless they pose a safety or fuels hazard.

- **Hazard Tree Abatement:** Hazardous tree removal along roads within and leading to the project area: Trees will be cut and either sold when associated with a salvage sale unit, left in place or moved to an area that will not affect the safety of visitors.

- **Site Preparation:** Dead and dying trees would be removed in preparation for planting. Removal of trees could be accomplished by several means, such as cutting and removal of fuels or making merchantable timber available through a timber sale.

Treatments will be completed with the objective of preparing sites for reforestation. Treatment include:

- Reducing hazardous fuels
- reducing competition to the newly planted or naturally regenerated seedlings.
- Site preparation may be completed with both mechanized and hand treatments.
- leave enough material on the sites to provide microsites favorable for seedling survival. This includes down woody debris, standing snags, high stumps, and other features which create shade or help to reduce surface temperatures and increase the water holding capacity of the site.
- All treatments will comply with BMP's and other design features described in the Hydrology report.

Reforestation: About 250 acres within the project area are slated for reforestation. These areas are dominated by high fire severity burn patches that resulted in 98 percent or greater tree mortality or vegetation coverage loss, as measured by basal area from pre-fire conditions. Because of the large size of these patches and the intensity of the fire, few live trees are available to naturally reseed the area.

Existing Environment

The Eel River Basin provides regionally important habitat for anadromous fishes, including CC Chinook salmon (Oncorhynchus tshawytscha), SONCC Coho Salmon (O. kisutch), and NC Steelhead (O. mykiss). NC steelhead are found about 2 miles downstream of the project in the Middle Fork Eel River (MFE) and in tributaries. Some of which have been designated as critical habitat (CH) for steelhead (Figure 2).Chinook are found in the lower MFE within the Forest Boundary, but CH for CC Chinook was not designated on the MFE within the MNF.

MFE anadromous habitat on the Mendocino National Forest is generally properly functioning within the context of the climate and geomorphology: The larger streams including the MFE River have flashy flows and tend to not aggrade much large woody debris (LWD); tributary fish bearing streams are well stocked with LWD. These watersheds are fairly erosive and sediments and turbidity are elevated and pool depths shallower, compared with landscapes with more stable geology. A high landsliding frequency tends to keep the larger streams open, with limited streamside shade. With more solar input and high summer air temperatures, summer waters in the lower Middle Fork Eel River are generally too warm for any salmonid. Summer thermal refugias exist in tributary streams and at their confluences with the MFE.

Thermal conditions and stream flows are adequate for Chinook to spawn and the offspring to out migrate before stream temperatures rise in June. None of the waters accessible to coho within

the Forest have summer temperatures cool enough to meet juvenile coho needs, but the majority of anadromous waters do provide sufficient summer thermal refugia to meet the needs of steelhead.

An overview of salmon and steelhead stocks in MFE can be found in the 1994 MFE Watershed Analysis. The MFE watershed currently has two known species of anadromous salmonids, Chinook salmon and steelhead trout. Steelhead are able to access about 46 miles of the MFE watershed, and Chinook can only access the lower 6 miles (USDA 1994).

Steelhead are capable of passing natural barriers and moving higher into the watershed than salmon, and therefore occupy more miles of habitat. The MFE also supports stable self-sustaining populations of resident rainbow trout (*O. Mykiss).* Resident rainbow trout are a management indicator species. The analysis of effects to their habitat is the same used for Steelhead habitat. Therefore, the determination for rainbow trout as an MIS is the same as that found for NC Steelhead. The Watershed Analysis states that there are anecdotal accounts of adult coho caught in the MFE. California Department of Fish and Wildlife (CDFW) and USFS fisheries biologists believe that any coho in the MFE would have been strays and that the MFE is not capable of supporting a population of coho due to high summer stream temperatures.

The Chinook runs typically appear in the Eel River in October or November and are considered fall-run. The run in the MFE may extend to January or later, which may constitute a late-fall run. CDFW surveys are not able to extend throughout the watershed, but they confirm that Chinook and steelhead appear to be spawning annually in this watershed.

California Department of Fish and Wildlife surveys and genetic analysis indicate that the steelhead in the upper MFE watershed (the 5th field watershed) are composed mainly of summer-run fish (USDA, 2012).

Two Forest Service Sensitive (FSS) fish species have been found in these watersheds: Pacific lamprey and western brook lamprey. Both Pacific and western brook lamprey in California are dependent on cool to cold water streams; lamprey larvae are documented as preferring water temperatures less than 20°C (68°F) and having metabolic problems at higher temperatures. Pacific lamprey are known to exist in the Middle Fork Eel system, but no recent surveys have been conducted to confirm presence or absence from the system. Suitable habitat for Foothill yellow-legged frogs and Western pond turtle occur within the project area, and Western pond turtle are known to occur in Hammerhorn Lake.

The Beaver Creek 6th Field watershed drains directly into the Middle Fork of the Eel River via Beaver Creek. There are 7.71 miles of fish bearing streams within the project area via four streams: Beaver Creek, Buck Rock Creek, Hammerhorn Creek, and Smokehouse Creek. These streams provide 3.53 miles, 0.46 miles, 0.70 miles, and 1.95 miles of fish habitat respectively. 0.54 miles of ESA designated NC steelhead critical habitat exist within the project area exclusively in Beaver Creek from the confluence with the Eel River to just below the M1 road crossing.

Beaver Creek is a low gradient perineal stream with cold water and good spawning and rearing habitat for anadromous steelhead, *Oncorhynchus mykiss.* Within one mile of the confluence with

the Middle Fork Eel River, the gradient increases and prohibits upstream migration of adult anadromous *O. mykiss* to the upper reaches of Beaver and Smokehouse creeks. Multiple age classes of resident rainbow trout have been observed within the upper reach of Beaver Creek and Smokehouse. *O. mykiss* habitat within both streams is plentiful.

Buck Rock Creek flows generally northwest and empties into the designated critical habitat section of Beaver Creek. Steep gradient and natural barriers make this stream inaccessible to anadromous fish. Buck Rock Creek is well removed from any active management units for this project.

Hammerhorn Creek empties directly into the mainstem Middle Fork Eel River just upstream of the confluence with Beaver Creek. The first 0.4 miles of stream are accessible to anadromous fish and provide quality spawning and rearing habitat. Increased gradient and natural barriers make the upstream reaches inaccessible to anadromous *O. mykiss*, but provide fair habitat for resident *O. mykiss.* Hammerhorn Creek is the source water for the diversion pipe which fills Hammerhorn Lake.

Hammerhorn Lake is a 112,000 square foot reservoir created to support a hatchery stocked rainbow trout fishery. California Department of Fish and Wildlife have not stocked the lake in several years due to access issues from landslides in the area. The lake has been found to contain the exotic species, golden shiner (*Notemigonus crysoleucas*). Emergent vegetation has also been a common issue. With the diversion pipe from Hammerhorn Creek currently inoperable Hammerhorn Lake is expected to go completely dry at summer low flows.

In Summer 2020, the August Complex burned more than 1,000,000 acres of forest including the entire project area. Soil burn severity (SBS) is classified using modeling and categorized into 4 classes: Unburned, Low, Moderate, and High. Totals within the project area can be seen in table 2.

Table 2: August Complex Soil Burn Severity data within the project area.

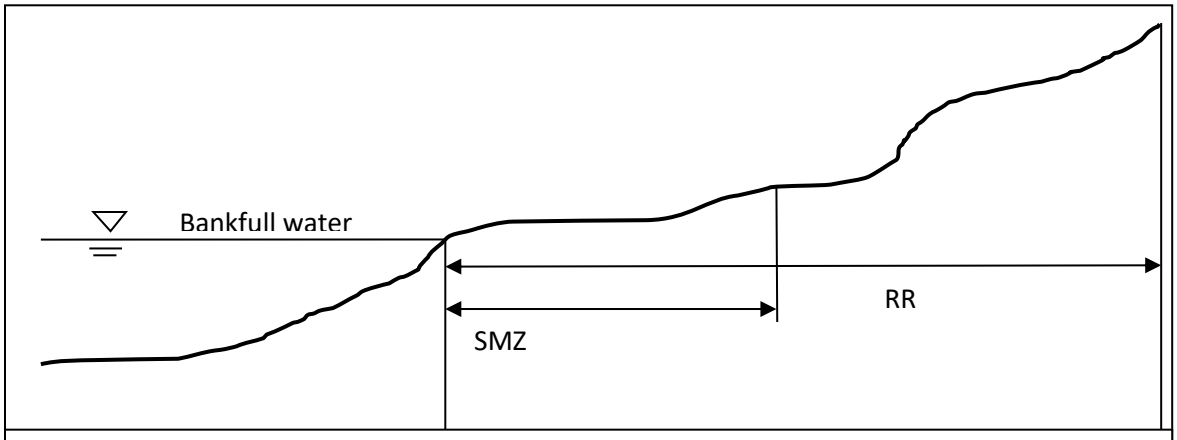
SBS Class	Acerage in Project Area
Unburned	990
Low	3387
Moderate	6366
High	2144

Riparian Reserves (RRs) and Streamside Management Zones (SMZs)

RRs and SMZs constitute a hierarchy of areas designated to protect water quality, aquatic, and riparian habitats (Figure 1). The highest level of protection occurs within the SMZ, where no mechanized equipment is allowed to operate except at designated crossings. Vegetation treatments are allowed within any of these zones but are subject to more stringent management requirements. There are a total of 89 acres of riparian reserves and 57 acres of SMZ within the project area.

Riparian reserves provide several functions that are important to watershed and aquatic health. They serve as filter strips to slow overland flow and trap sediment. While providing shade to regulate water temperature, they also provide for recruitment of Large Woody Debris (LWD) into the fluvial system. They can also provide micro-climates for habitat niches and connectivity corridors for wildlife. Riparian habitats typically burn with less severity than upland habitats during wildfire (Pettit and Naiman, 2007 and Figure 3). The majority of the Riparian Reserves within the Project Area are along intermittent streams and are composed of upland vegetation, with little to no phreatophytic vegetation present.

Overall Riparian Reserves are 150 feet from the wetted width on both sides of the creek, for a maximum total of 300 feet on fish bearing perennial streams. Intermittent and ephemeral streams within the action area will have riparian reserves of 100 feet on either side of the stream for a total riparian reserve of 200 feet. The SMZ and RR are illustrated below in figure 3.



SMZ width for each stream class:

- **Fish-bearing perennial**: the greater of 100 foot slope distance or to the slope break
- **Non-fish bearing perennial:** the greater of 50 foot slope distance or to the slope break

Figure 3. Definition sketch for Riparian Reserves (RRs) and Streamside Management Zones (SMZs)

Effects of the Proposed Actions

The potential for effects are defined below:

Discountable – an action that would have no detectable change to a resource.

Negligible – an action that may cause a change to a resource, but the change would be so small that it would not be of any measurable consequence to the resource and would cause no impairment to the resource.

Minor – an action that may cause a change to a resource, but the change would be small and if measurable, it would result in a small and localized consequence, but would not cause impairment of the resource.

Moderate – an action that would cause some change to a resource and the change would have a definite and measurable consequence, but is localized in the extent of the impact (confined to a small area). Moderate impacts have the potential to slightly impair the resource.

Major – an action that would cause a definite change to a resource and the change would be readily measurable and would have a substantial consequence to the resource. Major impacts may be significant and could result in resource impairment.

Effects of The Proposed Actions on Threatened, Endangered, Proposed, Candidate, and Forest Service Sensitive Species

This section examines the direct, indirect, and cumulative effects on a sub-watershed, watershed, and basin scale for Threatened Southern Oregon/Northern California Coasts (SONCC) coho salmon (Oncorhynchus kisutch), Northern California (NC) Steelhead (Oncorhynchus mykiss) and Coastal California (CC) Chinook salmon (Oncorhynchus tshawytscha), as well as, Forest Service Sensitive Species Pacific Lamprey (*Entosphenus tridentatus*), Western Brook Lamprey (*Entosphenus tridentatus*), Foothill yellow-legged frog, and Western pond turtle (and associated habitat. The analysis considers proximity to the action, existing condition of the habitat, and the intensity of the actions.

There would be no negative effects to coho or Chinook salmon because coho are far removed from project work. The closest known coho population is more than 50 stream miles away from the project and the closest know Chinook population is greater than 19 miles downstream . Therefore, coho and Chinook salmon will not be discussed further in the effects analysis.

Direct Effects

No mechanical vegetation management activities are proposed to occur near anadromous stream channels; therefore no direct effects are expected on anadromous fish from the implementation of the project. There would be no loss of live riparian vegetation in the action area due to the prescription to only remove dead or dying trees, and the effectiveness of Best Management Practices in relation to timber harvest. The equipment exclusion zone along streams will restrict mechanical equipment from within 50 feet of the streambank which would prevent impacts to riparian vegetation. No direct effects to FHYL frogs or Western pond turtles. Suitable habitat within the project area is well removed from harvest units and SMZ of 50 feet will allow for the dispersal common of these species.

Indirect Effects

Indirect effects could occur by temporary increased sedimentation in streams. Rubber tired skidding has the highest potential to cause detrimental ground disturbance when making multiple passes over the same ground. This can lead to detrimental soil compaction which has a low filtration rate and can lead to the erosion of bare soil and sedimentation introduction to the watershed. Heavy equipment would not be allowed closer than 50 feet from stream channels which should provide an adequate buffer to intercept and assimilate any sediment produced by vegetation management (Robichaud et al 2020). This is particularly true on slopes with lower angles (<15%) that typically occur next to the stream. Lowered angled slopes deliver less sediment through a buffer than higher angled slopes (Elliot et al., 2010). Upon project competition ground cover of no less than 70% will be left within Riparian Reserves further decreasing the likelihood of increased sedimentation after the project.

Perineal and intermittent stream crossings could be another source of temporary increased sedimentation. No perineal crossing will occur in this project and 1 intermittent crossing will occur along an unnamed tributary of Beaver Creek (Figures 2 and 4). A barrier will placed on the streambed and the crossing will be filled with gravel to facilitate dry crossing of equipment. Upon project completion gravel fill will be removed and the streambed will be returned to a natural condition. Stream banks will be left with a minimum of 70% ground cover and in a hydrologically neutral condition. With these design features the risk of increased sedimentation reaching fish bearing reaches is very low.

No potential water drafting sites will occur within fish bearing streams, but any water drafting within aquatic habitat would follow the following design features: Locate water drafting sites to avoid adverse effects to in-stream flow and depletion of pool habitat.

- Streambank and in-channel excavation will be kept to a minimum. Use pumps with low
- Entry velocity (350 gpm) to minimize removal of aquatic species.
- Use screening devices on water drafting pumps to avoid juvenile fish removal.

Screen mesh criteria:

Screen mesh must be in good repair and present a sealed positive barrier effectively preventing entry of the “design fish” into the intake. The design fish in this case is an immature (20-30mm) salmon or steelhead fry. The screen mess will also prevent uptake of egg masses and juvenile FHYL frogs.

Screen mesh size shall be:

- Round openings – max. 3/32 inch diameter (.09 inch)
- Square openings – max. 3/32 inch diagonal (.09 inch)
- Slotted openings – max. 1/16 inch width (.07 inch)

A part of this analysis relies on the effective implementation of BMPs. The Mendocino National Forest evaluated BMPs related to timber harvest for implementation and effectiveness; sites evaluated included skid trails, log deck landings, timber sale administration, streamside management zones, meadow protection and vegetation manipulation (e.g., mastication/shredding). From 2006 to 2010, 76 evaluations were done and 100% were found to be effective for BMPs related to landings, timber sale administration, streamside management zones, meadow protection and vegetation management. Skid trail BMPs were found to be effective at 93% of sites evaluated. Monitoring data from across the entire region was evaluated for the years 2003-2007 and found that BMPs related to timber harvest were effective 96% of the time (USDA, 2012 and Stanislaus National Forest, 2008). Four National Forests from the Cascades and Sierra Nevada reported that USFS streamside management zone BMPs were effective in preventing sediment from entering streams (Litschert and MacDonald, 2009).

Watershed effects as a result of the proposed action have been analyzed using the Cumulative Watershed Effect (CWE) process (as required by USDA FSH 2509.22, Soil and Water Conservation Handbook, Chapter 20- Cumulative Off-Site Watershed Effects Analysis). This analysis considers all ground-disturbing activities (past, present, and foreseeable future) including: past wildfire, prescribed fire, vegetation treatments, grazing, non-Forest Service timber activities, and roads. The analysis also considers soil burn severity of the 2020 August Complex, as well as any known timber operations on private land as a result (Emergency Timber Harvest Plans).

Spatial boundaries for the CWE analyses include 7th field (HUC 14, approximately 2,000-10,000 acres). These watersheds are 2nd to 4th order streams. Temporal Bounding of **t**he CWE analysis considers all ground-disturbing activities in the past (up to ten years prior), present, and reasonably foreseeable future.

Scores for the CWE analysis is based on the Equivalent Roaded Acre (ERA); one unit of ERA is equal to one acre of land that is completely roaded (or compacted). In calculating ERA's, all ground disturbing activities are assigned an activity coefficient. This is due to the fact that most disturbances are a fraction of an ERA and have a recovery period. For example, a partial cut with tracked skidder has an activity coefficient of 0.18 and recovery period of 10 years. Permanent disturbances that have little to no recovery (e.g. roads and landings) have a coefficient of 1.

Initial ERA= acres of activity * activity coefficient

For subsequent years, to account for recovery:

Projected ERA= Initial ERA * 0.5^ (recovery years/ recovery half-life)

A percent disturbance for the watershed is then calculated as the %ERA:

%ERA= ERA / watershed acres * 100

This %ERA value is compared to a pre-determined Threshold of Concern (TOC); and when the %ERA is greater than the TOC, further analysis is required to determine if water yield, erosion, or sedimentation are of concern. The TOC varies with soil erodibility, geologic stability, and

drainage density and is determined for each watershed. The more stable the stream is, the greater the TOC coefficient, which range from 0.08 to 0.16. If it is impractical to survey an affected stream to determine stability rating, then the watershed is assigned the lowest TOC coefficient of 0.08

A lower TOC used generally indicates a low risk of cumulative watershed effects. Cumulative watershed effects can be affected by watershed size. Larger watersheds have a greater "dilution" factor; such that an activity has less of an impact when compared to a smaller watershed with same activity. Analysis was completed at the 7th field (approximately 2,000-10,000 acres) watershed (HUC 14).

Due to the extent and severity of the fire, TOCs are expected to exceed or approach for several years until vegetation reestablishes. Rhodes and Frissell (2016) concluded that any increases to water supply from logging would be localized and short-term and that "the maintenance of potential increases in water yield would require clearing of large percentage of forests at high frequency, on the order of 25% of watershed area every 10 years. This frequency and magnitude of forest removal would incur significant fiscal, logistical, and environmental costs".

While cumulative effects exceed or approach the "Threshold of Concern", it must be noted that this is due to the massive 2020 August Complex (not the difference between values in 2019 and 2020).

One watershed (Buck Rock) exceeds the "Threshold of Concern," (TOC) primarily due the acres in both high and moderate Soil Burn Severity rating. The other two watersheds (Hammerhorn and Smokehouse) approaches the TOC after the 2020 fire but does not exceed the TOC. Due to known active landslides in the area, treatment units themselves were planned to avoid known and suspected unstable areas.

Changes between the No Action TOC and Proposed Action (PA) TOC are very limited, in terms of an Equivalent Roaded Acre (ERA) condition. This indicates that this project will not lead to differences in cumulative watershed effects. Erosion and sedimentation due to the fire should be very similar to what they would be without this project (USDA, 2021).

All sub-watersheds will return to below TOC condition in 2022 independent of the project being implemented or not.

Table 3: Cumulative Watershed Effects Model Results

HUC 14	Alternative	TOC	2019 ERA	2020 ERA (Fire year)	2021 ERA (project Implementation)	2022 ERA	2023 ERA	2024 ERA
Buck Rock	PA	9.2	2.14	14.14	10.72	8.32	5.45	3.94
	No Act		2.14	14.14	10.72	7.90	5.07	3.60

Hammerhorn	PA	10.86	0.98	10.16	7.11	4.74	2.24	1.65
	No Act		0.98	10.16	7.11	4.61	2.12	1.55
Smokehouse	PA	11.51	1.38	10.25	7.29	4.99	2.63	2.02
	No Act		1.38	10.25	7.29	4.94	2.58	1.98

Cumulative Effects

The CWE effects calculated from all alternatives proposed in this project do not exceed each watershed's Threshold of Concern for 2022. While some alternatives may have less of a cumulative effect, there may be negative indirect effects as a result. The no action alternative has the least cumulative effects, but is the most susceptible to possible future catastrophic wildfires due to heavy fuel loads. The proposed action would have slightly more cumulative effects, but will have the most impact in reduction of fuels; thus reducing the possibility of catastrophic wildfires or reburns in future years

Cumulative effects analyses are only triggered in Section 7 consultation by a determination of adverse effects. Under ESA, those effects would only be reasonably foreseeable effects of nonfederal activities. Cumulative effects are not considered in the effects determination concerning jeopardy or adverse modification of designated critical habitat. Since no adverse effects are anticipated, no discussion of cumulative effects is warranted.

Determination of Effects

The Hammerhorn Campground Restoration and Salvage Project is within the geographic range of NC Steelhead trout and NC Steelhead designated critical habitat. It is my determination that this project **"May affect, is not likely to adversely affect"** this population and its habitat.

CC Chinook salmon and SONCC Coho salmon populations are well removed and downstream of the project area. Their respective designated critical habitats are only found in the mainstem of the MFE which is not expected to be affected by this project. It is my determination that this project will have **"No effect"** on the threatened populations and habitat listed above.

The project **may affect individuals** of Pacific lamprey, Western brook lamprey, Foothill Yellow-legged frog, and Western pond turtle species, but is not likely to cause a trend towards federal listing or a loss of viability because the potential to harm or harass individuals is very low if project design features and best management practices are followed.

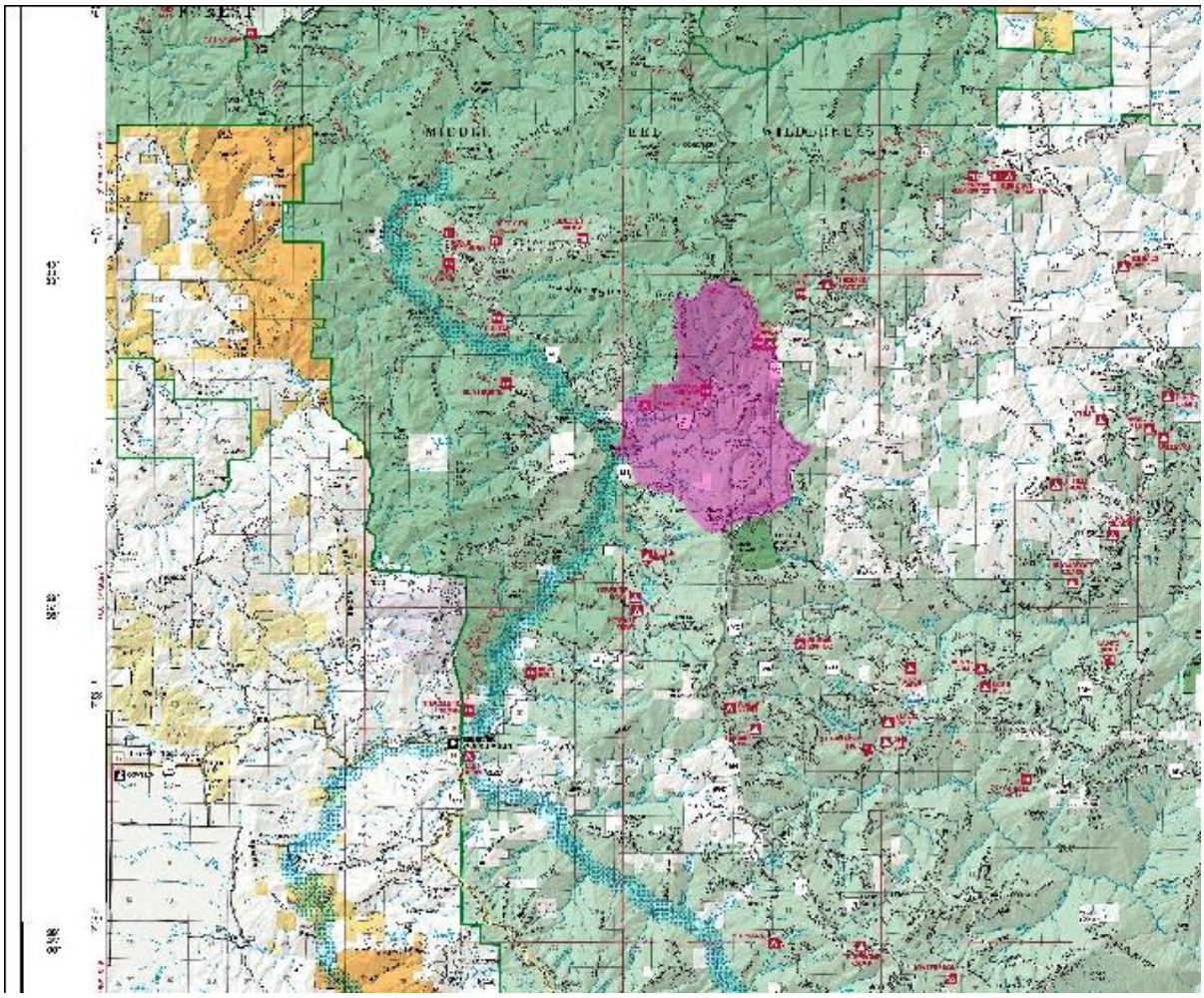


Figure 1: Map of Project Area on the Mendocino National Forest

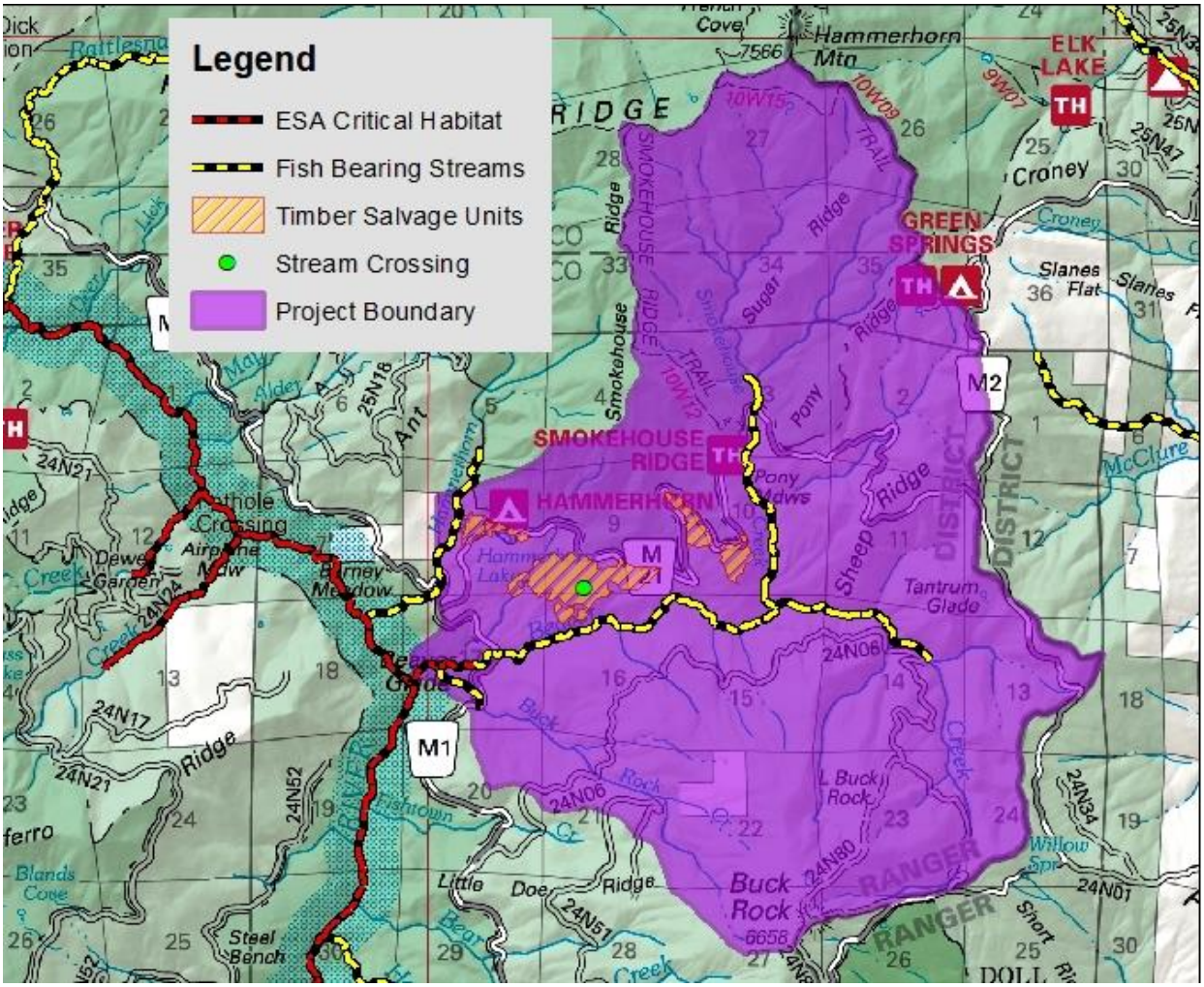


Figure 2: Detailed Map of the Project Area

Figure 3: Photograph of Smokehouse Creek (July 2021).

Figure 4: Photograph of Intermittent Stream at Proposed Crossing Site

References

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Appendix A

Project Design Features

- Ground Cover Retention of 50% and 70% on slopes greater than 50%.
- Ground Cover Retention of 70% in Streamside Management Zone
- No equipment entry within 50 feet of any stream type (perineal, intermittent, ephemeral).
- No water drafting will occur within fish bearing streams.
- All skid trails and temporary roads will be bladed, waterbarred and covered with slash upon project completion.

Best Management Practices

Forest management and associated road building in the steep rugged terrain of forested mountains has long been recognized as sources of non-point water quality pollution. Non-point pollution is not, by definition, controllable through conventional treatment means. It is controlled by containing the pollutant at its source, thereby precluding delivery to surface water. Sections 208 and 319 of the Federal Clean Water Act, as amended, acknowledge land treatment measures as being an effective means of controlling non-point sources of water pollution and emphasize their development.

The Forest Service has developed and documented non-point pollution control measures to National Forest System lands. These measures were termed "Best Management Practices" (BMPs) and are designed to accommodate site specific conditions. They are tailor-made to account for the complexity and physical and biological variability of the natural environment.

The following BMP's have been identified to address watershed management concerns. These BMPs come from the 2012 Forest Service publication "National Best Management Practices for Water Quality Management on National Forest System Lands." The implementation monitoring is done after the project has been completed, but before the winter season. Effectiveness monitoring is then completed on year later to determine success of BMP implementation.

All work and hauling should be done outside of the rainy season when soils are dry and potential damage to roads are minimized.

AqEco 2- Operations in Aquatic Ecosystems

Objective: Avoid, minimize, or mitigate adverse impacts to water quality when working in aquatic ecosystems.

Application: Common construction or maintenance operations in waterbodies often involve ground disturbance. The close proximity to, and contact with, the waterbody increases the potential for introducing sediment and other pollutants that can affect water quality. This BMP includes practices for minimizing direct and indirect water quality impacts when working in or adjacent to waterbodies.

Implementation:

-Equipment will not be operated when ground conditions are such that excessive damage will result. The kinds and intensity of control work required of the purchaser will be adjusted to ground and weather conditions, with emphasis on the need to control overland runoff, erosion, and sedimentation. Erosion-control work required by the contract will be kept current. At certain times of the year this means daily, if precipitation is likely, or at least weekly when precipitation is predicted for the weekend.

-If the contractor fails to perform seasonal erosion-control work prior to any seasonal period of precipitation, or runoff, the Forest Service may temporarily assume responsibility, complete the work, and use any unencumbered deposits as payment for the work.

Chem 3 (Chemical Use Near Waterbodies)

Objective- Avoid or minimize risk of chemical delivery to surface water or groundwater when treating areas near waterbodies.

Application- Some chemicals used in terrestrial applications are toxic to aquatic flora and fauna, any overly enrich aquatic systems, and may pose a human health hazard if drinking water sources are contaminated during or after chemical applications.

To help protect surface waters and wetlands from contamination, a buffer zone of land and vegetation adjacent to the waterbody will be designated. Spill contingency plan would also be implemented if a spill occurs.

Chem 5 and Road 10 (Chemical Handling and Disposal/ Equipment Refueling and Servicing)

Objective

Chem 5- Avoid of minimize water and soil contamination when transporting, storing, preparing, and mixing chemicals; cleaning equipment or disposing chemical containers.

Road 10- Avoid or minimize adverse effects to soil, water quality, and riparian resources from fuels, lubricants, cleaners, and other harmful materials discharging into nearby surface waters or infiltrating through soils to contaminate groundwater resources during refueling and servicing activities.

Application- Handling chemicals, chemical containers and equipment (including petroleum-based) can lead to contamination of surface water or groundwater if not done carefully. Spills, leaks, or wash water can contaminate soil and leech into groundwater. Residue left on containers or equipment can wash off during precipitation events and enter surface waters.

Containers should be inspected on a regular basis to ensure no leaks, and stored away from riparian reserves. Spill kits should be available in case of an accidental spill. All waste should be disposed of according to state, federal and local regulations.

Road 4 (Road Operations and Maintenance)
Objective- Avoid, minimize, or mitigate adverse effects to soil, water quality, and riparian resources by controlling road use and operations and providing adequate and appropriate maintenance to minimize sediment production and other pollutants during the useful life of the road.

Application- Consideration is given to the potential water quality effects from road damage when oversize or overweight loads are driven over forest roads. Roads should be routinely inspected to ensure they are not being impacted by log trucks. Water all dirt roads to minimize dust.

Veg 2 (Erosion Prevention and Control)
Objective- Avoid, minimize, or mitigate adverse effects to soil, water quality, and riparian resources by implementing measures to control surface erosion, gully formation, mass slope failure, and resulting sediment movement before, during, and after mechanical vegetation treatments.

Application- The process of erosion control has three basic phases; planning, implementation, and monitoring. During planning, areas subject to excessive erosion, detrimental soil damage and mass failure can be identified and avoided. Suitable erosion control measures are implemented while the maintenance of implemented measures will ensure their function and effectiveness over their expected design period.

The potential for accelerated erosion or other soil damage during or following mechanical treatments depends on climate, soil type, site conditions, and type of equipment and techniques used at the site. Erosion control measures are grouped into two general categories: structural measure to control and treat runoff and increase infiltration and nonstructural measures to increase ground cover.

Veg 3 (Aquatic Management Zone) (also Riparian Reserves and Streamside Management Zones)
Objective- Avoid, minimize, or mitigate adverse effects to soil, water quality, and riparian resources when conducting mechanical vegetation treatment activities in AMZ.

Application- Designation of an AMZ around and adjacent to waterbodies is a typical BMP to avoid, minimize, or mitigate adverse effects to soil, water quality, and riparian resources. Mechanical vegetation treatments are a tool that can be used within the AMZ to achieve a variety

of resource-desired conditions and objectives when implemented with suitable measures to maintain riparian and aquatic ecosystem structure, function, and processes. Depending on site conditions and resource-desired conditions and objectives, mechanical vegetation treatments in AMZ could range from no activity or equipment exclusion to purposely using mechanical equipment to create desired disturbances or conditions. When treatments are to be used in AMZ, a variety of measures can be employed to avoid, minimize, or mitigate soil disturbance, damage to waterbody, loss of large woody debris recruitment, and shading, and impacts to floodplain function.

Veg 4 (Ground-Based Skidding and Yarding Operations)

Objective- Avoid, minimize, or mitigate adverse effects to soil, water quality, and riparian resources during ground-based skidding and yarding operations by minimizing site disturbance and controlling the introduction of sediment, nutrients, and chemical pollutants to waterbodies.

Application- Ground-based yarding systems include an array of equipment from hoses, rubber-tired skidders, and bulldozers, to feller or bunchers, forwarders, and harvesters. Each method can compact soil and cause soil disturbance, though the amount of impact depends on the specific type of equipment used, the operator, unit design, and site conditions. Ground-based yarding systems can be designed and implanted to avoid, minimize, or mitigate potential adverse effects to soils, water quality, and riparian resources.

Veg 6 (Landings)

Objective- Avoid, minimize, or mitigate adverse effects to soil, water quality, and riparian resources from construction and use of log landings.

Application- Landings are generally sites of intense activity, with lots of equipment working in these concentrated areas. Chemicals and fuels are often stored at these locations to service equipment, leaving a high probability of soil compaction, overland flow, and soil contamination. Any chemical and fuel containers should be disposed of appropriately, in addition to any refuse (tires, chains, chokers, cables, and miscellaneous discarded parts). Contaminated soils should also be disposed appropriately. Provide ground cover where necessary to prevent erosion.

WatUse3 (Administrative Water Development)

Objective- Avoid, minimize, or mitigate adverse effects to soil, water quality, and riparian resources when developing and operating water sources for Forest Service administrative and resource management purposes.

Application- Water source developments are needed to supply water for a variety of Forest Service administrative and resource management purposes, including dust control. Locations used for drafting should be preexisting locations, such as any of the boat ramps along Lake Pillsbury or under the bridge of M1, below Scott Dam. Utilizing a high volume pump will help prevent water trucks from having to back down into water (which could have an effect of water quality if the truck has a leak).

Road 7- Stream Crossings

Objective- Avoid, minimize, or mitigate adverse effects to soil, water quality, and riparian resources when constructing, reconstructing, or maintaining temporary and permanent waterbody crossings.

Application- Construction, reconstruction, and maintenance of a crossing usually requires heavy equipment to be in and near streams, lake, and other aquatic habitats to install or remove culverts, fords, and bridges, and their associated fills, abutments, piles, and cribbing. Such disturbance near the waterbody can increase the potential for accelerated erosion and sedimentation by altering flow paths and destabilizing streambanks or shorelines, removing vegetation and ground cover, and exposing or compacting the soil. Use of heavy equipment has a potential for contaminating the surface water form vehicle fluids or introducing aquatic nuisance species.

BMP Checklist

This checklist was created as an easy way to ensure all BMP's are followed. BMP's have been characterized for applicability for pre, during, and post project. (check boxes for each stage, greyed out boxes do not apply to that stage).

Pre	During	Post	BMP
Chem 3- Chemical Use Near Waterbodies			
			Implement the chemical spill contingency plan elements within the project safety plan if a spill occurs.
			Buffer of 10 feet when applied near any surface water
Road 10- Equipment Refueling and Servicing/ Chem 5- Chemical Handling and Disposal			
			Allow refueling and servicing only at locations well away from water or riparian resources.

			Transport and handle chemical/fuel containers in a manner that prevents leaks and spills.
			Inspect, secure, and check containers regularly.
			Store any chemicals, including fuels, outside of Riparian Areas. Install contour berms and trenches around vehicle service and refueling areas, chemical storage and use areas, and waste dumps to fully contain spills if necessary.
			Have spill kit or containment device on hand.
			Dispose of containers and contaminated soils appropriately from NFS lands.
			Report spills and initiate appropriate clean-up action in accordance with applicable State and Federal laws, rules and regulations.
Road 4- Road Operations and Maintenance			
			Water all dirt roads used for hauling.
			Inspect roads/haul routes frequently to ensure roads are not being impacted by log trucks.
			Restrict use or modify route if road is being damaged, such as unacceptable surface displacement or rutting.
			Roads used for hauling will be graded.
Veg 2- Erosion Prevention and Control			
			No ground-based mechanical equipment entry into unstable areas (unstable riparian reserves), such as active landslides and inner gorges. Inner gorges are 65% and above slopes immediately adjacent to stream beds. They extend up slope until a slope break where slopes are less than 65% or at ridge top.
			Leave felled hazard trees if fuels density meets objectives.
			All water control features (especially on roads) must be repaired and in working condition post-haul or prior to big storms.
			Use existing landings where possible. New landing construction should follow Veg 6 practices.
			No ground equipment on road cuts/road fills over 25% slope.

Veg 3- Aquatic Management Zones (Riparian Reserves and Streamside Management Zones, RRs and SMZs)

			Retain all riparian-associated vegetation within the SMZs and RRs of seeps, springs, and unstable areas.
			Crossings of streams must be approved by the district hydrologist or fish biologist.
			Tractor piling is not permitted within RRs or SMZs.
			Cover bare soil areas that exceed 50 sq ft with mulch or slash if the area is likely to deliver sediment to a stream.
			For RRs: On slopes <50%, retain at least 50% ground cover (litter, duff, rocks) evenly distributed across the treatment area. For slopes >50%, retain at least 70% ground cover.
			SMZs have been identified and will be marked in the field with blue/white stripe flagging prior to implementation.
			For SMZs: Retain at least 70% ground cover (litter, duff, rocks) evenly distributed across the treatment area.
			For SMZ: <u>No ground-based mechanized equipment will be allowed in SMZ</u>.
			For SMZ: Trees cut in the SMZ must be felled toward the RR. If it is necessary to remove the tree, it should be end lined or grapple skidded from outside of the SMZ, suspending one end where feasible.

RR and SMZ width for each streamclass: (*Numbers are for EACH side)

Streamclass	Riparian Reserve Buffer	Streamside Management Zone Buffer
Perennial	300 feet	The greater of 50’ slope distance or to the slope break
Perennial Fish Bearing	300 feet	The greater of 100’ slope distance or to the slope break.
Intermittent	150 feet	The greater of 50’ slope distance or to the slope break
Ephemeral	100 feet	The greater of 50’ slope distance or to the slope break

Veg 4- Ground-Based Skidding and Yarding Operations

			Locate skid trails outside of the SMZ to the extent practicable.
			Locate skid trails to avoid concentration runoff and provide breaks in grade. Avoid long run on steep slopes.
			Limit the grade of constructed skid trails on geologically unstable, saturated, highly erodible, or easily compacted soils.
			Prohibit equipment in designated SMZ's. Material may be removed from this zone; however, heavy equipment is excluded and would require review and approval by District or Forest Hydrologist for entry.
			While restoring skid trails, place appropriate water bars to prevent sedimentation. Provide slash cover where applicable.
			In **Riparian Reserves**, fell only trees necessary to meet project objectives. When felling trees, retain the highest stump possible.
			Mechanical operations should occur during dry soil conditions; typically May 15-October 15. Operating during these times will minimize impact and reduce the potential for increased erosion.
			Ground-based heavy equipment will be limited to stable slopes less than 35%. Occasional use on stable slopes up to 40% for a distance not to exceed 100 feet is acceptable.
			Retain at least 50% ground cover (litter/duff/rock) across **all treatment areas**. Retention and even distribution of fine vegetation (rather than rocks) should be favored for ground cover and nutrient cycling.
			Fall merchantable trees perpendicular to roads to minimize the skidding lengths.
			Align non merchantable hazards trees along the contour to create erosion control, if possible, given safety considerations.
			Preference for utilizing <u>tracked</u> feller bunchers.
			Maintain ALL live or possible re-spurouting vegetation for stability.
			Any soil displacement caused by the mechanical equipment greater than 4 inches in depth would be back bladed or water-barred to prevent water concentration.
			Remove any material resulting from project activities causing obstruction of stormflows, (immediately upstream of culverts).
			Ensure recognition and protection of areas related to water quality protection delineation on Sale Area Maps. The sale administrator and purchaser will review these

			areas on the ground prior to commencement of ground disturbing activities. Examples of water quality protection features that will be designated on the project map include: 1) Location of streamcourses and riparian reserves to be protected 2) Wetlands (meadows, lakes, springs, etc.) to be protected. 3) Unstable areas to be protected.
Veg 6- Landings			
			Remove all logging machinery refuse (tires, chains, chokers, cables, and miscellaneous discarded parts).
			Install any suitable drainage features to prevent erosion.
			Provide ground cover where needed.
Water Use 3- Administrative Water Developments			
			Water will not be drafted from project-area streams
			Below 4.0 cfs, drafting rates should not exceed 20 percent of surface flows.
			Draft from existing locations/approaches.
			Follow Road 10/Chem 5 to prevent contamination of fuels and chemicals into waterways.
			Water-drafting vehicles shall contain petroleum spill kits. Dispose of absorbent pads accordingly.
Road 7. Stream Crossings			
			Cross small streams (width-wise) and ephemeral or intermittent streams where possible.
			Utilize previous crossings, if appropriate.
			Cross stream directly, not at an angle.
			Cross streams where the stream bottom is stable and the banks are low and intact. If stream bottom is not ‘hard’, consider reinforcement with rock (including approaches).
			Long approaches to the crossing should have runoff/sediment control (divert water off the road onto the forest floor)

			Where possible, install an appropriate structure (bridge, culvert, pole ford, etc) to minimize rutting and erosion.
			For Culverts, minimum size should be 18 inches and extend a minimum of one foot beyond the upstream and downstream tow of backfill placed around the culvert. Length should not exceed 40 feet. Filter Cloth: place filter cloth on the streambed and stream banks before installing the culvert and backfill. The filter cloth should extend a minimum of six inches and maximum of one foot past the toe of the backfill. Culvert placement: The culvert should be installed on the natural stream bed grade Backfill: No earth or fine-gran soil backfill should be used for temporary culvert crossings. Backfill should be clean, coarse gravel.
			If no structures or reinforcement are in place, stagger tire tracks to minimize rutting.
			Construct stream crossings during low flow periods.
			Monitor stream crossing structures during the timber harvest for plugging.
			Removal of crossing (if it has a chance for plugging) prior to winter or large incoming storms. Ensure waterbars are in place to divert water. Slash where appropriate.

Appendix B

CHECKLIST FOR DOCUMENTING ENVIRONMENTAL BASELINE AND EFFECTS OF PROPOSED ACTION ON RELEVANT INDICATORS [1]

Watershed Name: Middle Fork Eel River **Location:** Eel River Basin **Proposed Project:** Hammerhorn Campground Restoration and Salvage Project

INDICATORS	ENVIRONMENTAL BASELINE			EFFECTS OF THE ACTION		
	Proper Function	At Risk	Not Properly Functioning	Restore	Maintain	Degrade
Temperature	2				3	
Sediment		4			5	
Chemical Contamination	6				7	
Substrate		8			9	
Large Woody Debris	10				11	
Pool Frequency	12				13	
Pool Quality		14			15	
Off Channel Habitat		16			17	
Refugia	18				19	
Physical Barrier	20				21	
Width:Depth ratio		22			23	
Streambank Condition		24			25	
Floodplain Connectivity	26				27	
Peak/Base Flow		28			29	
Drainage Net Increase		30			31	
Road Density/Location		32			33	
Disturbance History		34			35	
Riparian Reserves	36				37	

1 - This checklist covers the Middle Fork Eel (MFE) River Watershed. Information comes from USFS and CDFW stream surveys; from the Middle Fork Eel Watershed Analysis.

2 – Water temperatures in tributaries are properly functioning for salmonids. Lower MFE has unsuitable temperatures for salmonids beginning in the summer, but elevated temperatures are natural in this context considering the climate and geomorphology.

3 – Canopy in the riparian reserves would be generally intact and the stream shading would be almost unchanged.

4 – The erosion hazard is naturally high in the MFE. Sediment and turbidity are deemed to be no more than moderate problems since natural erosion is so high; some argue that these ratings should be considered properly functioning.

5 – Salvage logging could result in short term sediment delivery, but reforestation should result in a long-term reduction in sediment itroduction to streams.

6 – No chemical pollution is known to exist in this forested drainage.

7 – No chemicals would be introduced through project activities.

8 – Substrate is estimated to be no more than moderately embedded.

9 – The project activities would have no long-term effects on substrates.

10 – Large woody debris is not abundant in the MFE, but most of the River is characterized as transport reaches that would not aggrade much LWD. Small tributary streams do have adequate LWD.

11 – The project activities would have no effect on LWD for anadromous fish in the river or tributaries. Standing snags left in AMZ will allow natural LWD recruitment to continue.

12 – Boulders and bedrock form the largest pools in the MFE River. Pool development and maintenance in the river and tributaries appear to be very good over time. Large floods, such as the one that occurred in 1964, appear to result in temporary pool filling. Subsequent years of normal flows gradually move the gravels and reform the pools.

13 – The project activities would have no effect on pool frequency.

14 – Pool depths vary greatly in the river with very winter large bedload input from inner gorge landsliding. Pools in most of the river and most anadromous tributaries have fair to good quality pools, though landsliding impacts some streams as Balm of Gilead. Note – most of these landslides are in Wilderness and are natural.

15- The project would have no long-term effects on pool quality.

16 – Anadromous habitat on the MFE River and tributaries are primarily a Rosgen “B” channel with only limited off-channel habitat. Off-channel habitat is associated with lower gradient meandering streams.

17- The project activities would have no measureable effect.

18- Overall, the refugia are intact in MFE. As the MFE exits the approximate lower 5 miles on the Forest, summer water temperatures become too warm for salmonids, although some cool pockets of water may occur in which salmonids can exist throughout the summer.

19 – The project activities would have no effec on refugia values.

20- There are no human-created anadromous barriers in the MFE.

21- The project activities would have no negative effect

22- The MFE has a generally confined channel.

23- The project activities would have no measurable effect.

24- Coarse rubble and boulders, in and near the channel, characterize the MFE channel. Higher terraces, left by floods, have finer material. The river and tributaries also contain numerous slides with large amounts of erosive material that reach the water in many places. Still, the banks are more than 80% stable.

25- The project activities would have no measurable effect beyond the immediate tributary streams.

26- MFE and tributaries have a confined channel throughout most of the watershed but there is connectivity to immediately adjacent riparian areas as the existing geomorphology allows.

27- The project activities would have no effect on floodplain connectivity.

28- Parts of the MFE watershed have been logged and roaded. It is likely that the hydraulic regime has been changed to some degree.

29- The project would have no measurable effects.

30- MFE has a low average of roads per square mile due to extensive wilderness and the drainage increase is no more than moderate.

31- The project would have no effect.

32- MFE has a low average of roads per square mile due to extensive wilderness, but roads cross unstable areas.

33- The project would have no effect.

34- Much of the watershed is wilderness, but human disturbance is deemed to be moderate in some portions of the watershed. The watershed is characterized as generally recovering, though most subwatersheds are currently above the Threshold of Concern due to the 2020 August Complex.

35- The ground disturbance from project activities will be limited to 250 acres, and will produce little disturbance to the overall watershed.

36- The riparian reserves are healthy in most of the watershed. Tributary streams in the majority of watershed are well vegetated with large trees. Upper MFE River is also well vegetated with

conifers, except where they were burned in the 2020 wildfires. The banks of the middle and lower MFE River have limited vegetative ground cover and trees due to landsliding and high annual flows. In the lowermost 10 miles the river banks are primarily oaks, brush, and grasslands. Here the river has little streamside LWD recruitment and almost no shade except for the land topography and boulders. However the lack of riparian vegetation in the lower river is natural for the existing geomorphology.

37- The project activities would have little effect on the riparian vegetation at the watershed scale.